

ANNUAL SURVEILLANCE REPORT

**TUBERCULOSIS IN UTAH**

FIVE-YEAR STATISTICAL REVIEW

2002 – 2006

May 2007

Bureau of Communicable Disease Control

Utah Department of Health

Table of Contents

List of Figures .....ii

List of Tables .....iii

Executive Summary.....iv

Figures..... 1

Reference Tables ..... 23

## List of Figures

	Page	Reference Table on Page
Figure 1. Reported TB Cases, Utah, 1993-2006	1	23
Figure 2. TB Case Rates, Utah and US, 1993-2006	2	23
Figure 3. Percent of TB Cases by Local Health District, Utah, 2002-2006	3	24
Figure 4. TB Case Rates by Local Health District, Utah, 2002-2006	4	24
Figure 5. TB Cases by Gender, Utah, 2002-2006	5	25
Figure 6. TB Cases by Age Group, Utah, 2002-2006	6	25
Figure 7. Percentage of TB Cases by Race/Ethnicity, Utah, 2002-2006	7	25
Figure 8. TB Cases by Race/Ethnicity and Length of US Residence in Blacks/ African Americans, Utah, 2002-2006	8	25
Figure 9. TB Case Rates by Race/Ethnicity, Utah, 2002-2006	9	26
Figure 10. Percent of TB Cases in Foreign, US-Affiliated Islands (UAI), vs US-Born Persons, Utah, 2002-2006	10	25
Figure 11. Countries of Origin for Foreign-Born Persons Reported with TB, Utah, 2002-2006	11	27
Figure 12. Length of US Residence Prior to TB Diagnosis in Foreign-Born Persons, Utah, 2002-2006	12	27
Figure 13. TB Cases by Residence at Time of Diagnosis, Utah, 2002-2006	13	28
Figure 14. Homelessness and Substance Abuse in TB Cases Aged $\geq 15$ , Utah, 2002-2006	14	28
Figure 15. Completeness of HIV Test Results in Persons with TB by Age Group, Utah, 2002-2006	15	29
Figure 16. HIV Coinfection in Persons Reported with TB, Utah, 2002-2006	16	29
Figure 17. TB Cases by Site of Disease, Utah, 2002-2006	17	28
Figure 18. TB Cases by Case Verification, Utah, 2002-2006	18	28
Figure 19. Primary Anti-TB Drug Resistance, Utah, 2002-2006	19	29
Figure 20. Use of Directly Observed Therapy (DOT), Utah, 2001-2005	20	30
Figure 21. Final Classification of TB Suspects, Utah, 2002-2006	21	30
Figure 22. Class B Immigrants/Refugee Arrivals, Utah, 2002-2006	22	31

## List of Tables

Table 1.	Reported TB Cases and Case Rates, Utah and United States, 1993-2006
Table 2.	TB Cases, Percentages, and Case Rates per 100,000 by Local Health District, Utah, 2002-2006
Table 3.	TB Cases and Percentages by Gender, Age Group, Race/Ethnicity, and Foreign/US-Affiliated Islands (UAI)s/US-Born Status, Utah, 2002-2006
Table 4.	Reported TB Cases and Case Rates by Race/Ethnicity, Utah, 2002-2006
Table 5.	Countries of Origin for Foreign-Born Persons Reported with TB, Utah, 2002-2006
Table 6.	Length of US Residence Prior to TB Diagnosis in Foreign-Born Persons, Utah, 2002-2006
Table 7.	TB Cases by Residence at Time of Diagnosis, Adult Homelessness and Substance Abuse, Site of Disease, and Case Verification, Utah, 2002-2006
Table 8.	TB Cases and Percentages in Persons with HIV Test Results and with HIV Coinfection by Age Group, Utah, 2002-2006
Table 9.	Primary Anti-TB Drug Resistance, Utah, 2002-2006
Table 10.	Use of Directly Observed Therapy (DOT), Utah, 2001-2006
Table 11.	Final Classification of TB Suspects, Utah, 2002-2006
Table 12.	Class B Immigrant/Refugee Arrivals, Utah, 2002-2006

## Executive Summary

Tuberculosis (TB), like many other infectious diseases, is a challenge to control. Its airborne mode of transmission, failure of providers to “think TB” as morbidity declines, elevated rates in racial/ethnic groups and foreign-born persons, and its prolonged treatment regimen of six months or more are just some of the obstacles faced by those attempting to eliminate the disease.

This report is a five-year statistical review of TB in Utah from 2002 through 2006. Although some aspects of Utah's TB epidemiology mirror national trends, there are aspects of the local epidemiology that differ and must be considered in controlling the disease in our state.

The key findings of this report are:

The number of reported TB cases in Utah has generally declined since 1993. During the five-year period from 2002 through 2006, Utah reported an average of 34 cases of TB per year.

Utah is a low-incidence TB state, with TB case rates about one-third of the national rate. From 2002 to 2006, Utah reported an average annual case rate of 1.4 per 100,000 persons.

The majority of Utah's TB morbidity occurs in Salt Lake County. Over the past five years, the percentage of TB cases from Salt Lake County has steadily increased - from 61% in 2002 to 76% in 2006. Utah County had the next highest TB morbidity with 8% of the cases between 2002 and 2006.

From 2002 to 2006, the TriCounty Health District had the highest TB case rate in the state at 2.9 cases per 100,000 persons. The Salt Lake Valley Health District ranked second with 2.4 cases per 100,000 persons.

Utah has a higher proportion of pediatric cases (<15 years of age) than the national average. From 2002 to 2006, 50% of Utah's pediatric TB cases occurred among foreign-born children – most of whom had been in the US for less than one year. Another 27% of the pediatric cases, all less than five years of age, were diagnosed with TB during the contact investigation that is conducted with every reported case of TB.

The disparity in TB rates between Whites and racial/ethnic minorities continues to persist, both in Utah and nationally. Over the past five years, the percentage of TB cases among Whites decreased from 42% in 2002 to 15% in 2006; and 2006 was the fourth year that Hispanics constituted the single largest percentage of TB cases among all racial/ethnic groups in Utah. Between 2002 and 2006 in Utah, Hispanics, American Indians or Alaska Natives, Native Hawaiian or Other Pacific Islanders, Asians, and Blacks or African Americans had TB rates 11.0, 14.0, 26.5, 33.8, and 58.0 times higher than Whites, respectively.

Utah has a higher percentage of TB cases among foreign-born persons than the national average. In 2005, Utah ranked fifth out of 50 states for the percentage of TB cases in foreign-born persons. From 2002 to 2006, the percentage of Utah's TB cases in foreign-born persons was 67%. Over the past five years, the three countries of origin with the highest percentage of TB cases in Utah were Mexico, Somalia, and Vietnam.

The majority of the cases reported with TB in Utah are among persons living in a private residence at the time of diagnosis. During the 2002 to 2006 time frame, approximately 89% of TB cases resided in a private

residence at the time of diagnosis; 5% were homeless; 3% were in a correctional institution; and 1%, each, lived in a long-term care facility or had other living arrangements.

Of TB cases aged  $\geq 15$  years reported in Utah from 2002 to 2006, an average of 9% reported being homeless in the 12 months prior to TB diagnosis; 1% reported injecting drug use; 3% reported noninjecting drug use; and 10% reported excess alcohol use.

During the 2002 to 2006 time frame, an average of 4% of TB cases of all ages were co-infected with HIV each year, and an average of 9% of persons aged 25-44 years were co-infected with HIV each year.

The majority of TB cases reported among Utah residents had pulmonary involvement. From 2002 through 2006, pulmonary cases accounted for an average of 62% of Utah's TB cases each year; and cases with both pulmonary and extrapulmonary involvement accounted for an average of 9% of the cases each year.

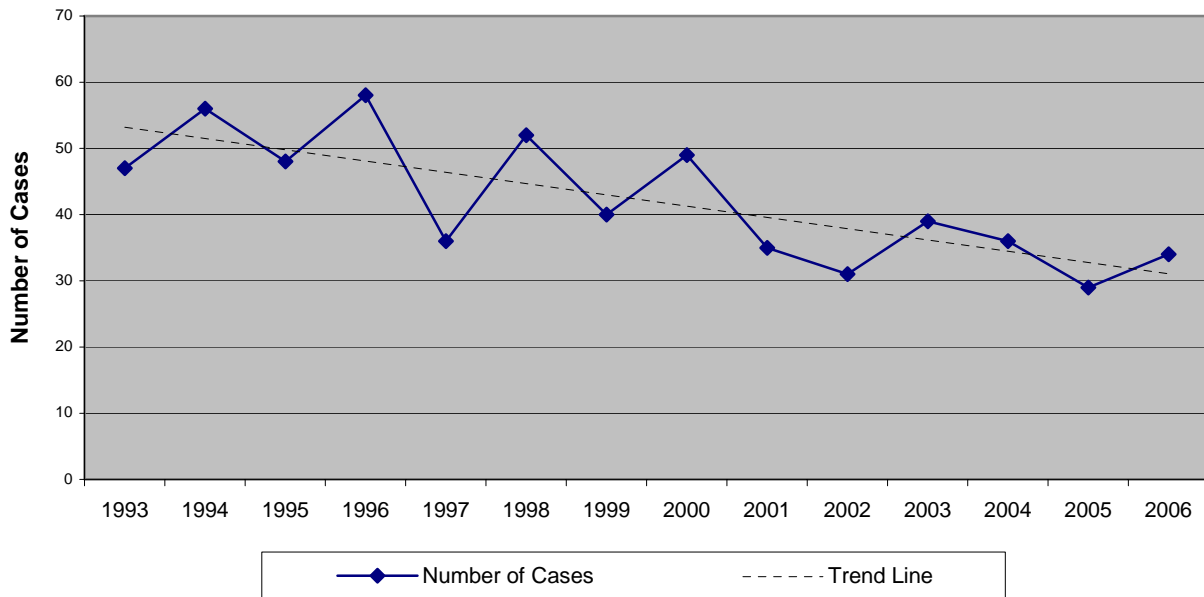
From 2002 to 2006, 75% of Utah's TB cases had a positive culture for *Mycobacterium tuberculosis*, and drug susceptibility testing was conducted on all but one of the isolates. Relative to the total number of laboratory culture-confirmed TB cases in this five-year period, 17% of the isolates were resistant to one or more antituberculosis medications and 8% had resistance to at least isoniazid (INH). One case was resistant to at least isoniazid and rifampin (RIF), known as multi-drug resistant TB (MDR-TB).

From 2001 to 2005, 93% of persons in Utah who were treated for TB had all doses of their medications given by directly observed therapy (DOT), and 6% completed their treatment utilizing a combination of directly-observed and self-administered therapy.

From 2002 to 2006, a total of 727 Utah residents were reported as suspect TB, and a five-year average of 23% of the TB suspects per year were later diagnosed with active TB disease.

Utah received 229 newly-arriving refugees and immigrants with Class B1 and B2 TB from 2002 to 2006. In 2006, 26 refugees with the newly-established "B-Other" category arriving from Thailand, where outbreaks of MDR-TB had occurred, were also evaluated.

**Figure 1. Reported TB Cases, Utah, 1993-2006**



See Table 1, pg 23.

Cases of TB were classified in the year of report to the Centers for Disease Control and Prevention.

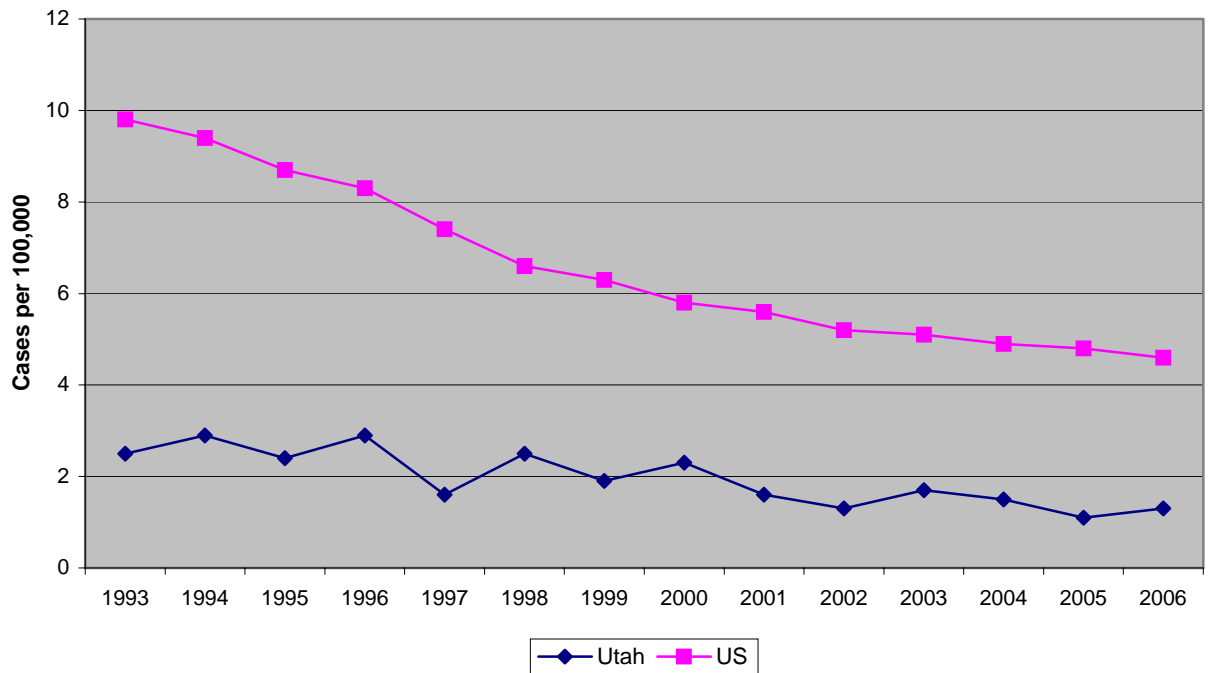
Source: The Utah Department of Health, Bureau of Communicable Disease Control, Tuberculosis Control Program.

Tuberculosis (TB) is a reportable disease in Utah, and most of our understanding of the occurrence of TB comes from case surveillance. Reports of Utah's TB cases are submitted to the Division of TB Elimination (DTBE), Centers for Disease Control and Prevention (CDC). Since 1993, these reports have been submitted using the Report of Verified Case of Tuberculosis (RVCT) form.

In 2006, 34 cases of active TB disease were reported in Utah, a 17% increase from the lowest reported case count of 29 the previous year. For the five-year period from 2002 to 2006, Utah had an average of 34 cases of active TB reported per year (range: 29-39).

Utah's TB case count has fluctuated since 1993. From 1993 to 2006, Utah had an average of 42 cases of active TB reported per year (range: 29-58). Despite the periodic increases, there was a general declining trend in the number of reported TB cases in Utah during this time period.

**Figure 2. TB Case Rates, Utah and US, 1993-2006**



See Table 1, pg 23.

Cases of TB were classified in the year of report to the Centers for Disease Control and Prevention (CDC).

Sources: US Case Rate – The Centers for Disease Control and Prevention, Division of TB Elimination; Utah Cases and Rates – The Utah Department of Health, Bureau of Communicable Disease Control, Tuberculosis Control Program.

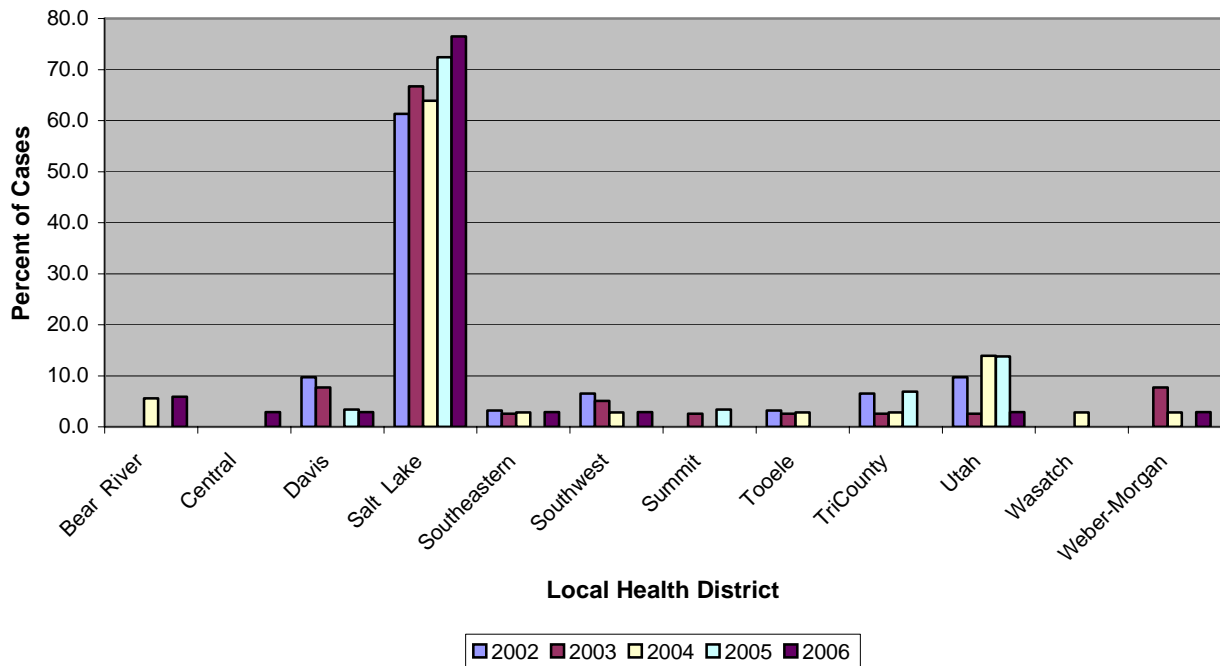
The 2006 TB case rate in Utah was 1.3 per 100,000 persons, an increase from 1.1 per 100,000 persons in 2005. For the five-year period from 2002 to 2006, Utah had an average of 1.4 cases of TB per 100,000 persons (range: 1.1-1.7 per 100,000 persons).

From 1993 to 2006, Utah's case rate was an average of 30% of the national rate.

Utah's TB case rate is below the national TB elimination goal of 3.5 per 100,000 persons by the year 2000 and slightly above the Healthy People 2010 goal of 1 per 100,000 persons.



**Figure 3. Percent of TB Cases by Local Health District, Utah, 2002-2006**



See Table 2, pg 24.

Cases of TB were classified in the year of report to the Centers for Disease Control and Prevention.

Source: The Utah Department of Health, Bureau of Communicable Disease Control, Tuberculosis Control Program.

The majority of Utah's TB morbidity occurs in Salt Lake County. In 2006, the Salt Lake Valley Health District (SLVHD) accounted for 76% (26 of 34) of the reported TB cases.

From 2002 to 2006, the percentage of TB cases from Salt Lake County has steadily increased - from 61% (19 of 31) in 2002 to 76% (26 of 34) in 2006 – and averaged 68% of total TB cases per year. Utah County had the next highest percentage distribution with 8% of the cases between 2002 and 2006 (range: 3% to 14%).

**Figure 4. TB Case Rates\* by Local Health District, Utah, 2002-2006**



See Table 2, pg 24.

\*Cases per 100,000 population.

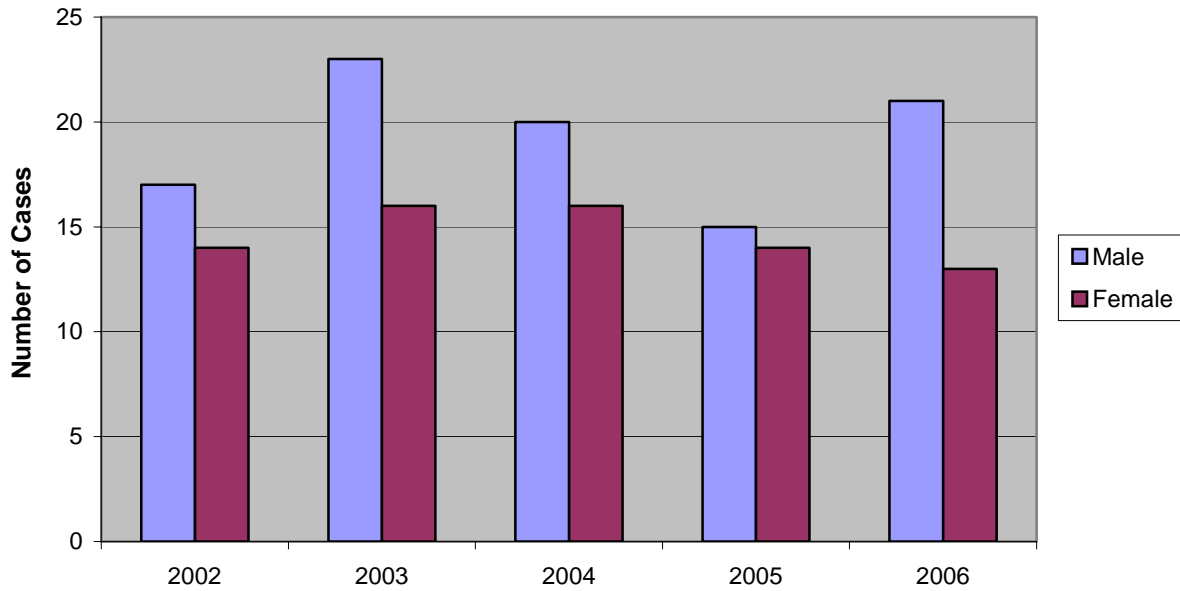
Cases of TB were classified in the year of report to the Centers for Disease Control and Prevention.

Source: The Utah Department of Health, Bureau of Communicable Disease Control, Tuberculosis Control Program.

From 2002 to 2006, the TriCounty and Salt Lake Valley Health Districts had the highest rates of TB per 100,000 persons. The TriCounty Health District had the highest TB case rate in the state at 2.9 cases per 100,000 persons. The Salt Lake Valley Health District ranked second with 2.4 cases per 100,000 persons.

American Indians or Alaska Natives represented 83% (5 of 6) of the cases in the TriCounty Health District, and foreign-born persons represented 76% (87 of 115) of the cases in the Salt Lake Valley Health District (data not shown).

**Figure 5. TB Cases by Gender, Utah, 2002-2006**



See Table 3, pg 25.

Cases of TB were classified in the year of report to the Centers for Disease Control and Prevention.

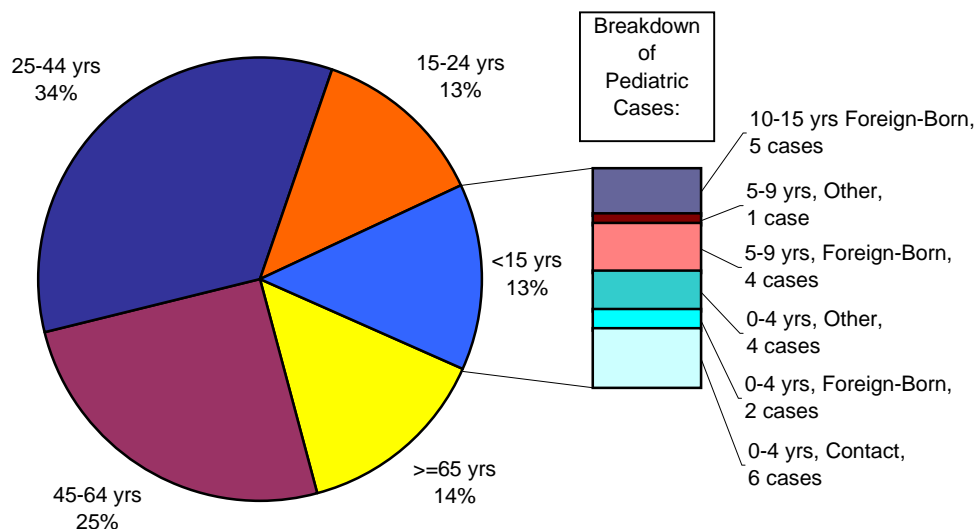
Source: The Utah Department of Health, Bureau of Communicable Disease Control, Tuberculosis Control Program.

In 2006, 62% (21 of 34) of persons with TB in Utah were male and 38% (13 of 34) were female.

During the 2002 to 2006 time frame, males accounted for an average of 57% of the TB cases per year (range: 52%-62%) while females accounted for an average of 43% (range: 38%-48%).

Utah's TB case distribution by gender is similar to that of the entire US. In 2005, 62% of the reported cases of TB in the US occurred in males and 38% occurred in females. (CDC. *Reported Tuberculosis in the United States*, 2005)

**Figure 6. TB Cases by Age Group, Utah, 2002-2006**



See Table 3, pg 25.

Cases of TB were classified in the year of report to the Centers for Disease Control and Prevention.

Source: The Utah Department of Health, Bureau of Communicable Disease Control, Tuberculosis Control Program.

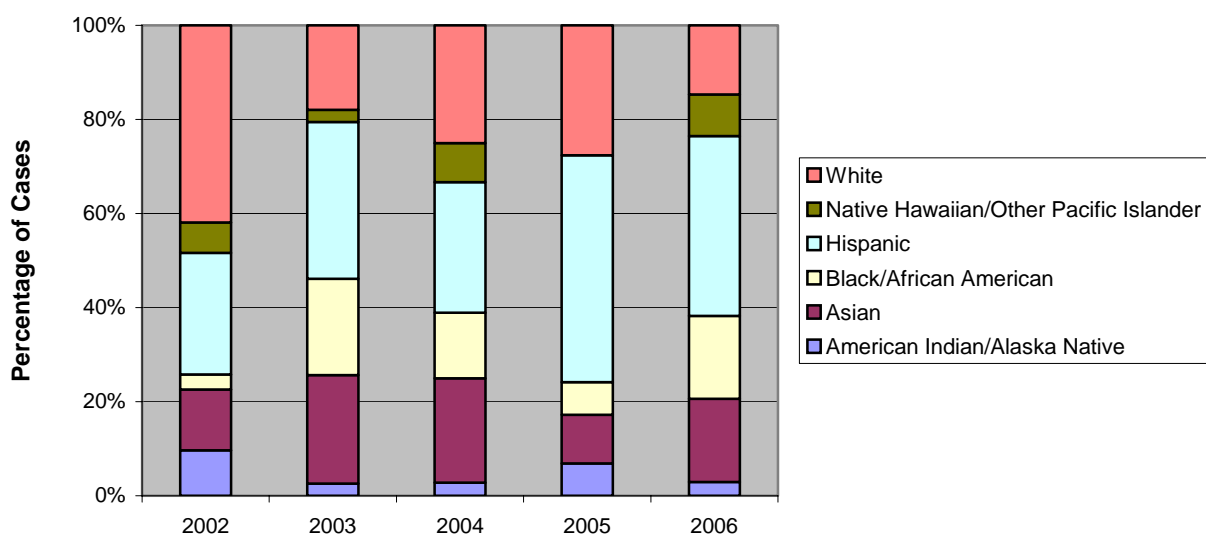
In 2006, 18% (6 of 34) of all TB cases in Utah occurred in children 0-14 years of age; 12% (4 of 34) in persons 15-24 years of age; 35% (12 of 34) in persons 25-44 years of age; 26% (9 of 34) in persons 45-64 years of age; and 9% (3 of 34) in persons over 65 years of age.

Of the 169 TB cases reported in Utah from 2002 to 2006, an average of 13% of the cases per year were <15 years of age (range: 6%-18%); 13% were 15-24 years of age (range: 10%-17%); 34% were 25-44 years of age (range: 26%-39%); 25% were 45-64 years of age (range: 19%-31%); and 14% were >=65 years of age (range: 9%-21%).

In 2005, the distribution of TB cases reported in the US by age group was as follows: 6% of the cases were <15 years of age; 11% were 15-24 years of age; 34% were 25-44 years of age; 29% were 45-64 years of age; and 20% were 65 years of age and older. (CDC. *Reported Tuberculosis in the United States*, 2005)

Utah's proportion of pediatric TB cases (<15 years of age) has been more than two times the national average in three out of the last five years. From 2002 to 2006, 50% (11 of 22) of the pediatric cases occurred among foreign-born children. Nine of these children had been in the US for less than one year and had their TB diagnosed as part of the health screening offered to newly-arriving refugees. Another 27% of the pediatric cases (6 of 22), all less than five years of age, were diagnosed with TB during the contact investigation that is conducted with every reported case of TB. Of the remaining five cases, three were children of foreign-born parents. Source case investigations were conducted but not successful in identifying the source case.

**Figure 7. Percentage of TB Cases by Race/Ethnicity,\*  
Utah, 2002-2006**



See Table 3, pg 25.

\*All races are non-Hispanic.

Cases of TB were classified in the year of report to the Centers for Disease Control and Prevention.

Source: The Utah Department of Health, Bureau of Communicable Disease Control, Tuberculosis Control Program.

In 2006, 86% of all reported TB cases in Utah occurred in racial and ethnic minorities (38% in Hispanics; 18% in Blacks or African Americans; 18% in Asians; 9% in Native Hawaiians or Other Pacific Islanders; and 3% in American Indians or Alaska Natives).

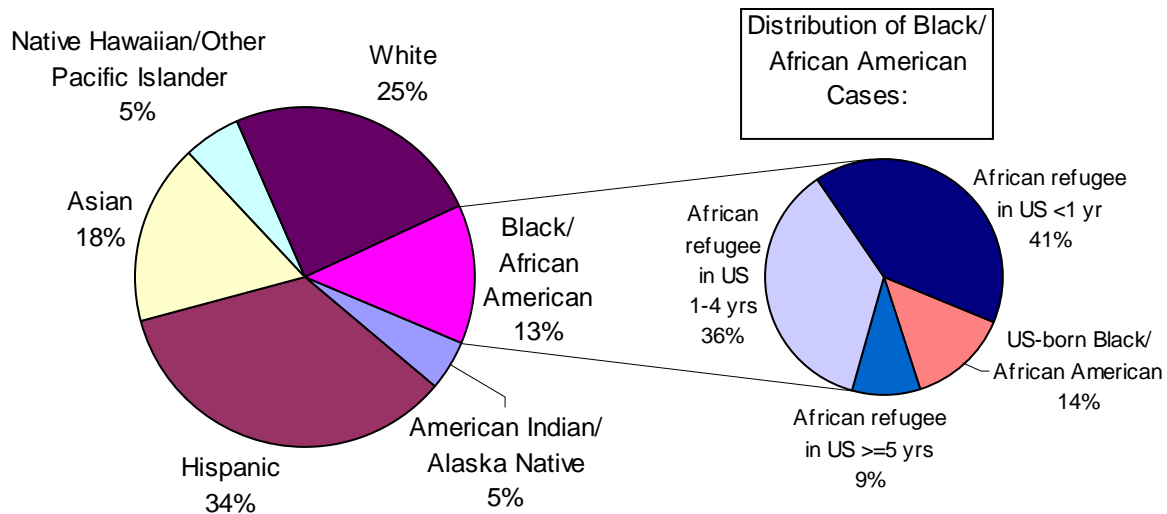
Over the past five years, the percentage of TB cases that were Whites decreased from 42% (13 of 31) in 2002 to 15% (5 of 34) in 2006. In 2006, Hispanics constituted the single largest percentage of TB cases among all racial/ethnic groups in Utah for the fourth consecutive year. The percentage of cases among Blacks or African Americans increased starting in 2003 with the arrival of additional refugee groups from East and West Africa.

In 2005, the distribution of TB cases reported in the US by race/ethnicity was as follows:

- 29% in Hispanics;
- 28% in Blacks or African Americans;
- 23% in Asians;
- 18% in Whites;
- 1% in American Indians or Alaska Natives; and,
- <1% in Native Hawaiians or Other Pacific Islanders.

(CDC. Reported Tuberculosis in the United States, 2005)

**Figure 8. TB Cases by Race/Ethnicity\* and Length of US Residence in Blacks/African Americans, Utah, 2002-2006**



See Table 3, pg 25.

\*All races are non-Hispanic.

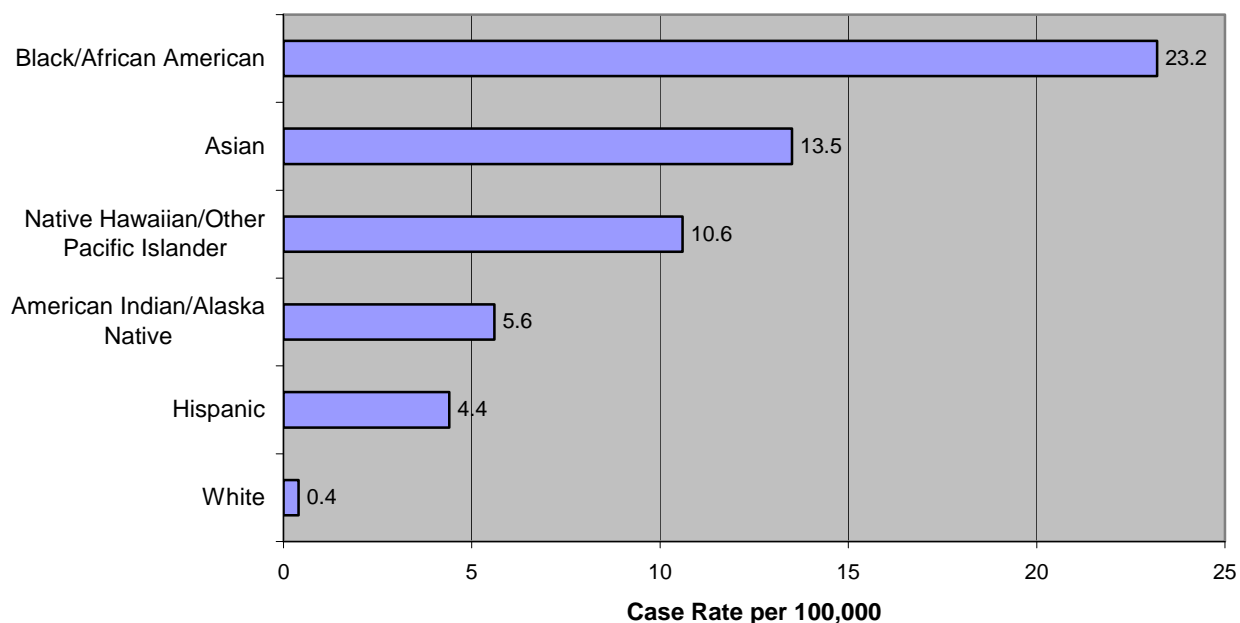
Cases of TB were classified in the year of report to the Centers for Disease Control and Prevention.

The five-year average distribution of TB cases reported in Utah by race/ethnicity from 2002 through 2006 was as follows:

- 34% in Hispanics (range: 26%-48%);
- 25% in Whites (range: 15%-42%);
- 18% in Asians (range: 10%-23%);
- 13% in Blacks or African Americans (range: 3%-21%);
- 5% in American Indians or Alaska Natives (range: 3%-10%); and,
- 5% in Native Hawaiians or Other Pacific Islanders (range: 0%-9%).

From 2002 through 2006, the percentage of TB cases among Blacks or African Americans in Utah increased from 3% (1 of 31) in 2002 to as high as 21% (8 of 39) in 2003, with a five-year average of 13%. The increase in TB cases in this racial group was the result of the arrival of refugees from East and West Africa to Utah. From 2002 to 2006, 86% (19 of 22) of the reported Blacks/African American cases were among African refugees – 41% (9 of 22) had been in US residence for less than one year; 36% (8 of 22) had been in US residence from one to four years; and 9% (2 of 22) had been in US residence for five years or more (data not shown).

**Figure 9. TB Case Rates by Race/Ethnicity,\* Utah, 2002-2006**



See Table 4, pg 26.

\*All races are non-Hispanic.

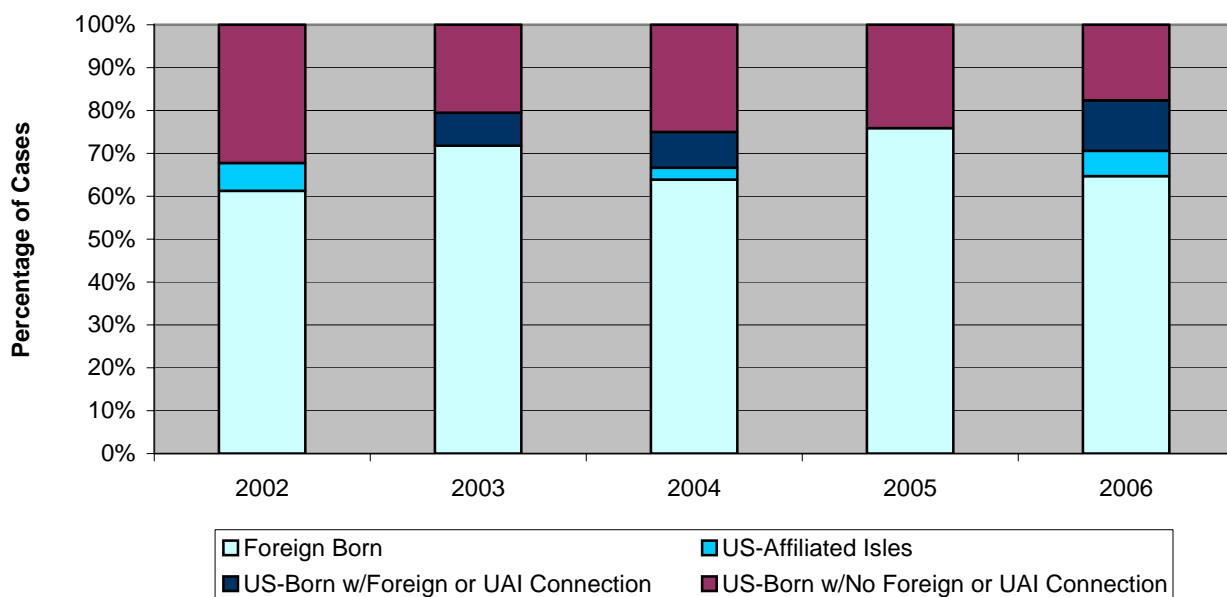
Cases of TB were classified in the year of report to the Centers for Disease Control and Prevention.

Source: The Utah Department of Health, Bureau of Communicable Disease Control, Tuberculosis Control Program.

In Utah, disparities in TB rates continue to exist between Whites and racial/ethnic minorities. Between 2002 and 2006, Hispanics, American Indians or Alaska Natives, Native Hawaiian or Other Pacific Islanders, Asians, and Blacks or African Americans had TB rates 11.0, 14.0, 26.5, 33.8, and 58.0 times higher than Whites, respectively. In Utah, 86% of TB cases in Blacks or African Americans occurred in foreign-born persons (see page 8).

Disparities in TB rates also continue to persist nationally between Whites and racial/ethnic minorities. In 2005, the US TB rates in Hispanics, American Indians or Alaska Natives, Native Hawaiian or Other Pacific Islanders, Asians, and Blacks or African Americans were 7.3, 5.3, 10.6, 19.8 and 8.4 times higher than Whites, respectively. (CDC. *Reported Tuberculosis in the United States*, 2005)

**Figure 10. Percent of TB Cases in Foreign, US-Affiliated Islands (UAI),\* vs US-Born, Utah, 2002-2006**



See Table 3, pg 25.

\*Includes persons born in American Samoa, the Federated States of Micronesia, Guam, the Republic of the Marshall Islands, Midway Island, the Commonwealth of the Northern Mariana Islands, Puerto Rico, the Republic of Palau, the US Virgin Islands, and US minor and outlying Pacific islands.

Cases of TB were classified in the year of report to the Centers for Disease Control and Prevention.

Source: The Utah Department of Health, Bureau of Communicable Disease Control, Tuberculosis Control Program.

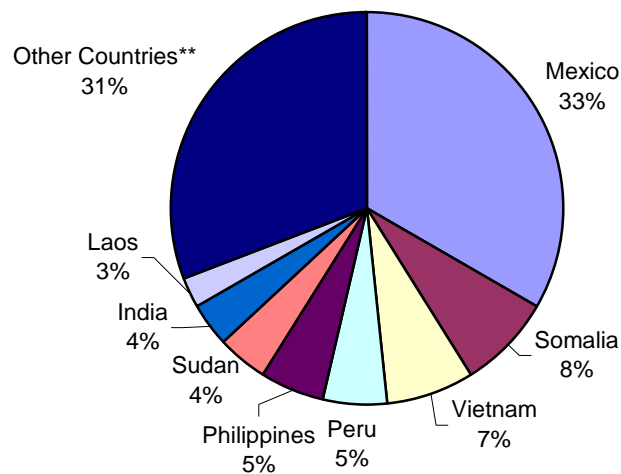
In 2006, 65% (22 of 34) of all reported TB cases occurred in foreign-born persons. Six percent (2 of 34) of the cases were among persons born in an US-affiliated island (UAI); 12% (4 of 34) had a foreign/UAI connection; two cases were among children of foreign-born parents; one was a household contact to an UAI case; and one had been a missionary in a country with a high incidence of TB. Eighteen percent (6 of 34) of the cases were US-born persons with no-known foreign connection.

From 2002 to 2006, foreign-born persons accounted for an average of 67% of the TB cases per year (range: 61%-76%). Persons born in an UAI accounted for an average of 3% of the cases per year (range: 0%-6%), and US-born persons with a foreign connection accounted for an average of 6% of the cases per year (range: 0%-12%). Persons with foreign connections included individuals who had lived in countries with a high incidence of TB, US-born children who were household contacts of foreign-born or UAI cases, and US-born children of foreign-born parents.

In 2005, 55% of all TB cases in the US occurred in foreign-born persons. Utah ranked fifth out of 50 states for its percentage of TB cases that were of foreign-born persons. These numbers show the importance of effectively screening and treating individuals from high TB prevalence areas. (CDC. *Reported Tuberculosis in the United States*, 2005)



**Figure 11. Countries of Origin for Foreign-Born\* Persons Reported with TB, Utah, 2002-2006**



See Table 5, pg 27.

\*Includes persons born outside the US, American Samoa, the Federated States of Micronesia, Guam, the Republic of the Marshall Islands, Midway Island, the Commonwealth of the Northern Mariana Islands, Puerto Rico, the Republic of Palau, the US Virgin Islands, and US minor and outlying Pacific islands.

\*\*Other countries include: Afghanistan, Argentina, Bangladesh, Bolivia, Bosnia, Cambodia, Canada, Chad, China, Cuba, Dominican Republic, El Salvador, Ethiopia, Guatemala, Iran, Iraq, Ireland, Israel, Korea, Kuwait, Lithuania, Liberia, Mongolia, Russia, Sierre Leone, Singapore, Tonga, Uruguay

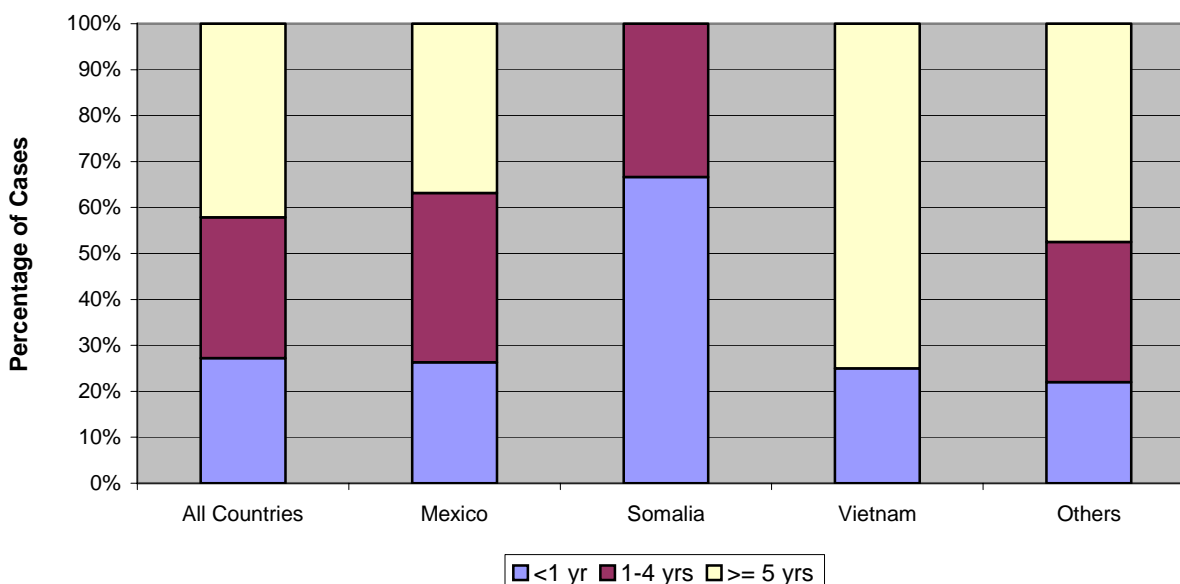
Cases of TB were classified in the year of report to the Centers for Disease Control and Prevention.

Source: The Utah Department of Health, Bureau of Communicable Disease Control, Tuberculosis Control Program.

The distribution of the countries of birth of foreign-born persons reported with TB in Utah from 2002 to 2006 illustrates the truly global nature of the disease. The top three countries of origin, Mexico, Somalia, and Vietnam, span three continents and accounted for 48% of the total number of cases. The top eight countries highlighted above accounted for 69% of the total.

Persons from 28 different countries each accounted for two percent or less of the total, but altogether accounted for 31% of foreign-born persons reported with TB in Utah.

**Figure 12. Length of US Residence Prior to TB Diagnosis in Foreign-Born Persons,\* Utah, 2002-2006**



See Table 6, pg 27.

\*Includes persons born outside the US, American Samoa, the Federated States of Micronesia, Guam, the Republic of the Marshall Islands, Midway Island, the Commonwealth of the Northern Mariana Islands, Puerto Rico, the Republic of Palau, the US Virgin Islands, and US minor and outlying Pacific islands.

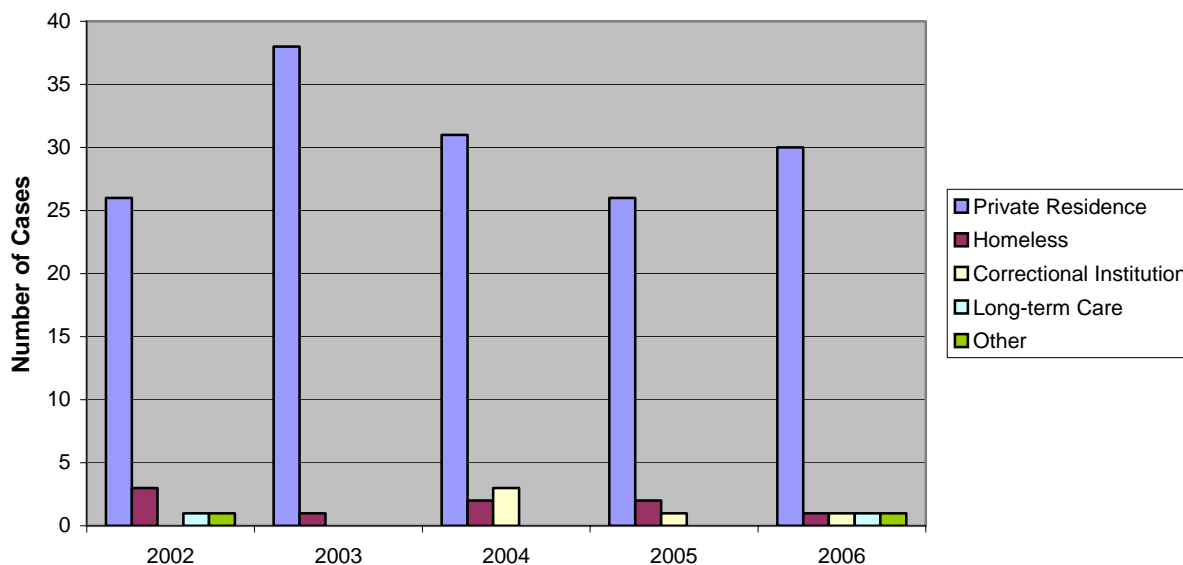
Cases of TB were classified in the year of report to the Centers for Disease Control and Prevention.

Source: The Utah Department of Health, Bureau of Communicable Disease Control, Tuberculosis Control Program.

Of all the cases of TB diagnosed in foreign-born persons in Utah from 2002 through 2006, 58% (66 of 114) of the cases of TB had been in the US for less than five years: 27% (31 of 114) for less than one year and 31% (35 of 114) between one and four years.

The top three countries with the highest percentage of TB cases in Utah over the past five years have three very different distributions of length of US residence prior to TB diagnosis. Among persons born in Mexico, 26% (10 of 38) had been in the US for less than one year; 37% (14 of 38) between one and four years; and 37% (14 of 38) for at least five years. Among persons born in Somalia, all had been in US residence for less than five years – with 67% (6 of 9) for less than one year. Among persons born in Vietnam, 25% (2 of 8) had been in the US for less than one year and 75% (6 of 8) for more than five years.

**Figure 13. TB Cases by Residence at Time of Diagnosis, Utah, 2002-2006**



See Table 7, pg 28.

Cases of TB were classified in the year of report to the Centers for Disease Control and Prevention.

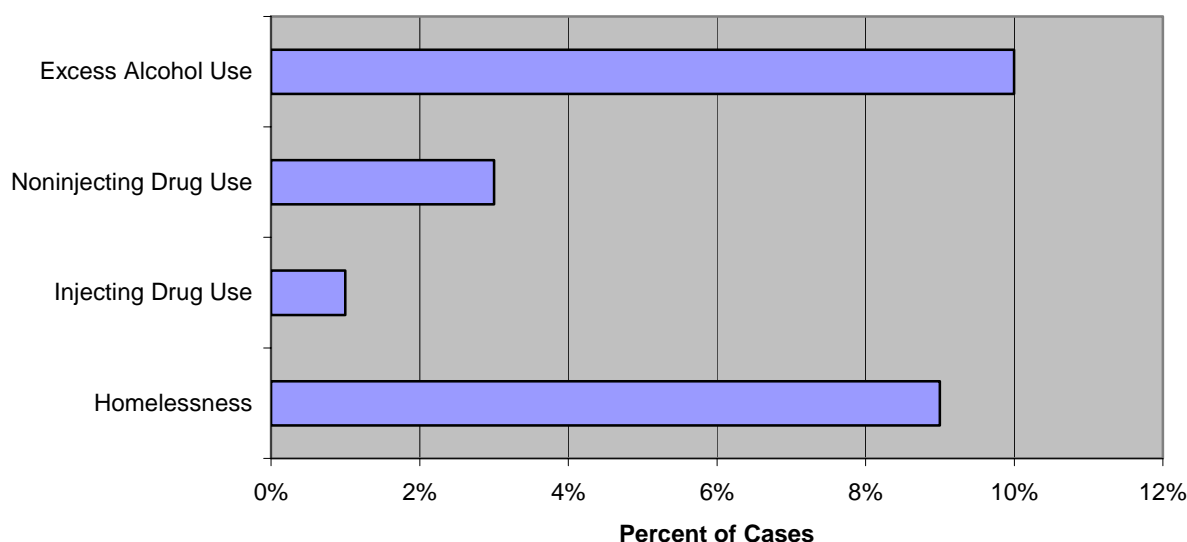
Source: The Utah Department of Health, Bureau of Communicable Disease Control, Tuberculosis Control Program.

The majority of TB cases reported in Utah are among persons living in a private residence at the time of diagnosis. In 2006, 88% (30 of 34) of persons with TB in Utah were living in a private residence at the time of their diagnosis. Of the remaining 12%, there was one case each of persons being homeless or living in a correctional institution, long-term care facility, or dormitory at the time of TB diagnosis.

Of the 169 TB cases reported during the 2002 to 2006 time frame, the distribution of residence at the time of diagnosis was as follows: 89% resided in a private residence (range: 84%-97%); 5% were homeless (range: 3%-10%); 3% were in a correctional institution (range: 0%-8%); 1% lived in a long-term care facility (range: 0%-3%); and 1% had other living arrangements (range: 0%-3%).

In 2005, the CDC began calculating percentages of residence in correctional and long-term care facilities at the time of diagnosis based on non-pediatric cases; homelessness is based on the 12 months prior to diagnosis and is discussed on the following page. Nationally, in 2005, 4% of cases  $\geq 15$  years of age were residents in a correctional facility at the time of diagnosis and 2% were residents in a long-term care facility. (CDC. *Reported Tuberculosis in the United States*, 2005)

**Figure 14. Homelessness and Substance Abuse in TB Cases  
Aged  $\geq 15$ , Utah, 2002-2006**



See Table 7, pg 28.

\* Homelessness and substance abuse in the 12 months prior to TB diagnosis.

Note: Categories are not mutually exclusive.

Cases of TB were classified in the year of report to the Centers for Disease Control and Prevention.

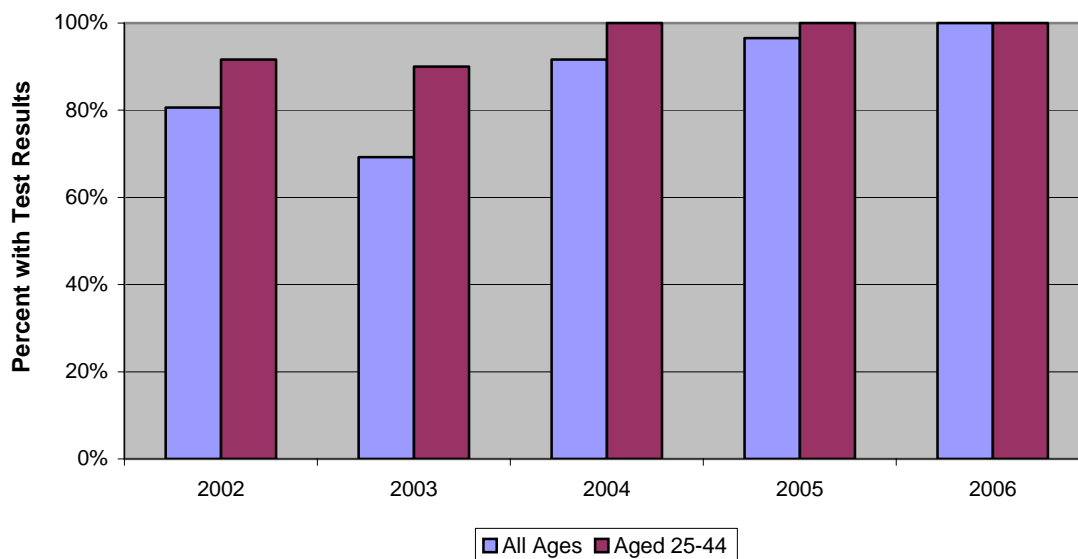
Source: The Utah Department of Health, Bureau of Communicable Disease Control, Tuberculosis Control Program.

In 2006, the percentages of TB cases in Utah aged  $\geq 15$  years who were homeless and/or reported substance abuse in the 12 months prior to TB diagnosis were as follows: 11% (3 of 28) were homeless; 4% (1 of 28) reported noninjecting drug use; and no persons reported injecting drug or excess alcohol use.

Of the 147 TB cases aged  $\geq 15$  years reported in Utah from 2002 to 2006, an average of 9% were reported as being homeless in the 12 months prior to TB diagnosis (range: 3%-15%). In terms of substance abuse in the 12 months prior to TB diagnosis, 1% reported injecting drug use (range: 0% to 4%); 3% reported noninjecting drug use (range: 0% to 6%); and 10% reported excess alcohol use (range: 0% to 21%).

In the US in 2005, the percentage of TB cases aged  $\geq 15$  years with information on homelessness and/or reported substance abuse in the 12 months prior to TB diagnosis was as follows: 6% were homeless; 2% reported injecting drug use; 8% reported noninjecting drug use; and 14% reported excess alcohol use. (CDC. *Reported Tuberculosis in the United States*, 2005)

**Figure 15. Completeness of HIV Test Results in Persons with TB by Age Group, Utah, 2002-2006**



See Table 8, pg 29.

Note: Includes persons with positive, negative, or indeterminate HIV test results. Percentages based on all reported TB cases. Cases of TB were classified in the year of report to the Centers for Disease Control and Prevention.

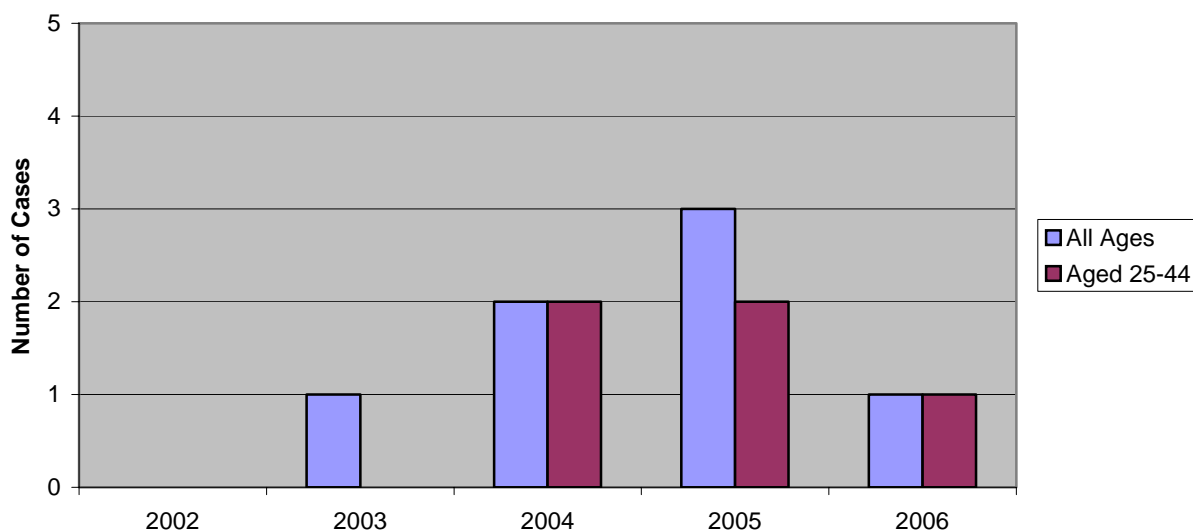
Source: The Utah Department of Health, Bureau of Communicable Disease Control, Tuberculosis Control Program.

Knowledge of a TB patient's HIV status is critical in ensuring that the optimal drug regimen is selected, to refer patients to HIV primary care if a positive result is newly detected, and to guide the conduct of contact investigations.

For the first time in 2006, all persons with TB in Utah reported HIV test results.

For the five-year period from 2002 to 2006, the percentage of TB patients for whom HIV test results were reported for persons 25-44 years of age increased from a low of 90% in 2003 to a high of 100% in 2004, 2005, and 2006. The percentage of TB patients for whom HIV test results were reported for persons of all ages increased from a low of 69% in 2003 to a high of 100% in 2006.

**Figure 16. HIV Coinfection in Persons Reported with TB, Utah, 2002-2006**



See Table 8, pg 29.

Note: Includes persons with positive, negative, or indeterminate HIV test results. Percentages based on all reported TB cases. Cases of TB were classified in the year of report to the Centers for Disease Control and Prevention.

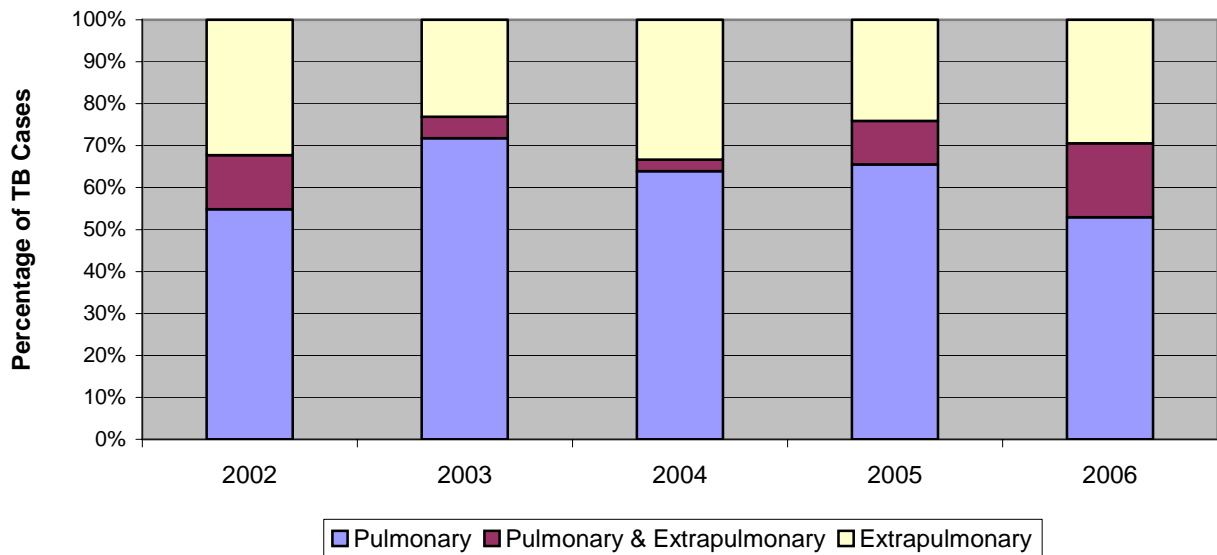
Source: The Utah Department of Health, Bureau of Communicable Disease Control, Tuberculosis Control Program.

In 2006, one Utah TB case aged 25-44 years (1 of 12 or 8%) was coinfectd with the human immunodeficiency virus (HIV). This one case represented 3% (1 of 34) of all reported cases of TB in Utah that were co-infected with HIV.

During the 2002-2006 time frame, an average of 4% of TB cases of all ages per year (range: 0% to 10%) were co-infected with HIV, and an average of 9% of persons aged 25-44 were coinfectd with HIV (range: 0% to 20%).

Utah's percentage of HIV coinfection in persons reported with TB is lower than the national average. In the US in 2004, an estimated 8% of persons with TB in all age groups, and 14% of persons aged 25-44, were co-infected with HIV. (CDC. *Reported Tuberculosis in the United States, 2005*)

**Figure 17. TB Cases by Site of Disease, Utah, 2002-2006**



See Table 7, pg 28.

Cases of TB were classified in the year of report to the Centers for Disease Control and Prevention.

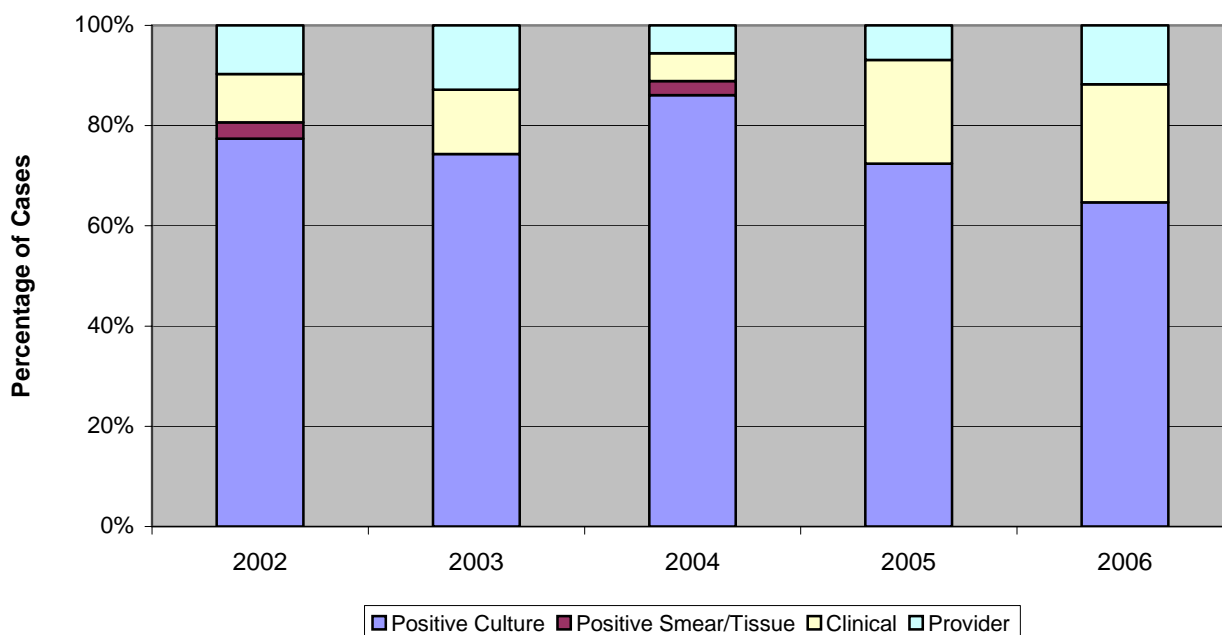
Source: The Utah Department of Health, Bureau of Communicable Disease Control, Tuberculosis Control Program.

In 2006, the percentage of TB cases with pulmonary disease alone was 53% (18 of 34). An additional 18% (6 of 34) had pulmonary and extrapulmonary involvement; therefore, 71% (24 of 34) of the TB cases had some pulmonary involvement. The remaining 29% (10 of 34) of the cases had extrapulmonary disease.

From 2002 to 2006, 169 TB cases were reported in Utah. Of these, 62% were pulmonary (range: 53%-72%); 9% were pulmonary and extrapulmonary (range: 3%-18%); and 28% were extrapulmonary (range: 23%-33%).

In 2005, 70% of the TB cases in the US were pulmonary; 9% had both pulmonary and extrapulmonary disease; and 21% were extrapulmonary. (CDC. *Reported Tuberculosis in the United States, 2005*)

**Figure 18. TB Cases by Case Verification, Utah, 2002-2006**



See Table 7, pg 28.

Cases of TB were classified in the year of report to the Centers for Disease Control and Prevention.

Source: The Utah Department of Health, Bureau of Communicable Disease Control, Tuberculosis Control Program.

In 2006, 65% (22 of 34) of TB cases reported in Utah were confirmed by isolation of *Mycobacterium tuberculosis* from a laboratory culture; 24% (8 of 34) were verified by the clinical case definition of TB; and 12% (4 of 34) were confirmed by provider diagnosis<sup>1</sup>.

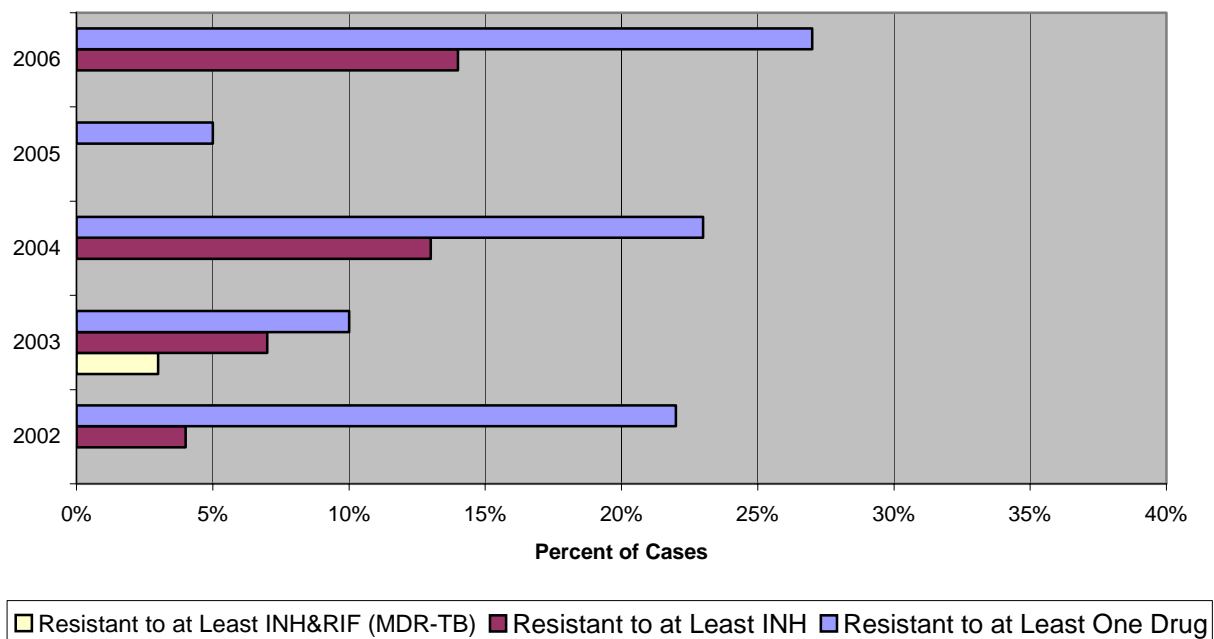
The case verification breakdown of the 169 TB cases reported in Utah from 2002 to 2006 was as follows: 75% by positive culture (range: 65%-86%); 1% by a positive acid-fast bacilli (AFB) smear/tissue with no culture (range: 0%-3%); 14% by clinical case definition (range: 6%-24%); and 9% by provider diagnosis (range: 6%-13%).

Utah's case verification distribution is very similar to that of all cases reported in the US. In 2005, 78% of the cases reported in the US were confirmed by laboratory culture; 1% by positive smear/tissue; 12% by clinical case definition; and 9% by provider diagnosis. (CDC. *Reported Tuberculosis in the United States*, 2005)

<sup>1</sup> Clinical cases are defined as cases that have a positive tuberculin skin test, other signs and symptoms compatible with TB, are treated with two or more antituberculosis medications, **and** have completed a diagnostic evaluation. When patients meet neither the laboratory nor clinical case definition, they may be verified TB cases based on provider diagnosis.



**Figure 19. Primary Anti-TB Drug Resistance, Utah, 2002-2006**



See Table 9, pg 29.

Cases of TB were classified in the year of report to the Centers for Disease Control and Prevention.

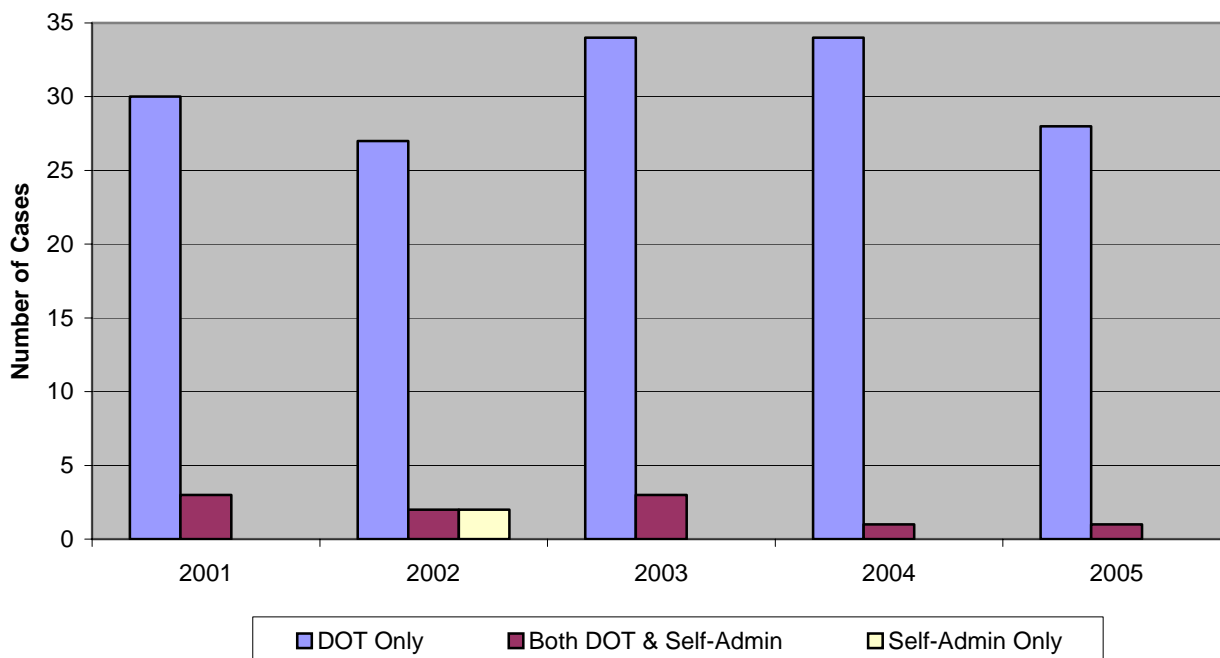
Source: The Utah Department of Health, Bureau of Communicable Disease Control, Tuberculosis Control Program.

Drug-susceptibility testing was performed on the initial specimen isolates for all 22 persons with TB confirmed by laboratory culture in 2006. Twenty-seven percent (6 of 22) of the isolates were resistant to one or more anti-tuberculosis medications, and 14% (3 of 22) of the cases were resistant to at least isoniazid (INH). No cases were resistant to at least INH and rifampin (RIF) - known as multi-drug resistant TB (MDR-TB).

During the 2002 to 2006 time frame, drug-susceptibility testing was completed on all but one of the 127 isolates of TB cases confirmed by laboratory culture. The percentage of culture isolates that had resistance to one or more antituberculosis medications relative to the total number of laboratory culture-confirmed TB cases ranged from 5% to 27%, with a five-year average of 17%. The percentage of culture isolates that had resistance to at least INH relative to the total number of culture-confirmed TB cases ranged from 0% to 14%, with a five-year average of 8%. Only one case of MDR-TB was reported during this time frame.

Utah's drug-susceptibility results are very similar to that of all cases reported in the US. In 2005, 8% of the cases reported in the US were resistant to at least INH and 1% of the cases were confirmed with MDR-TB. (CDC. *Reported Tuberculosis in the United States*, 2005)

**Figure 20. Use of Directly Observed Therapy (DOT), Utah, 2001-2005**



See Table 10, pg 30.

Cases of TB were classified in the year of report to the Centers for Disease Control and Prevention.

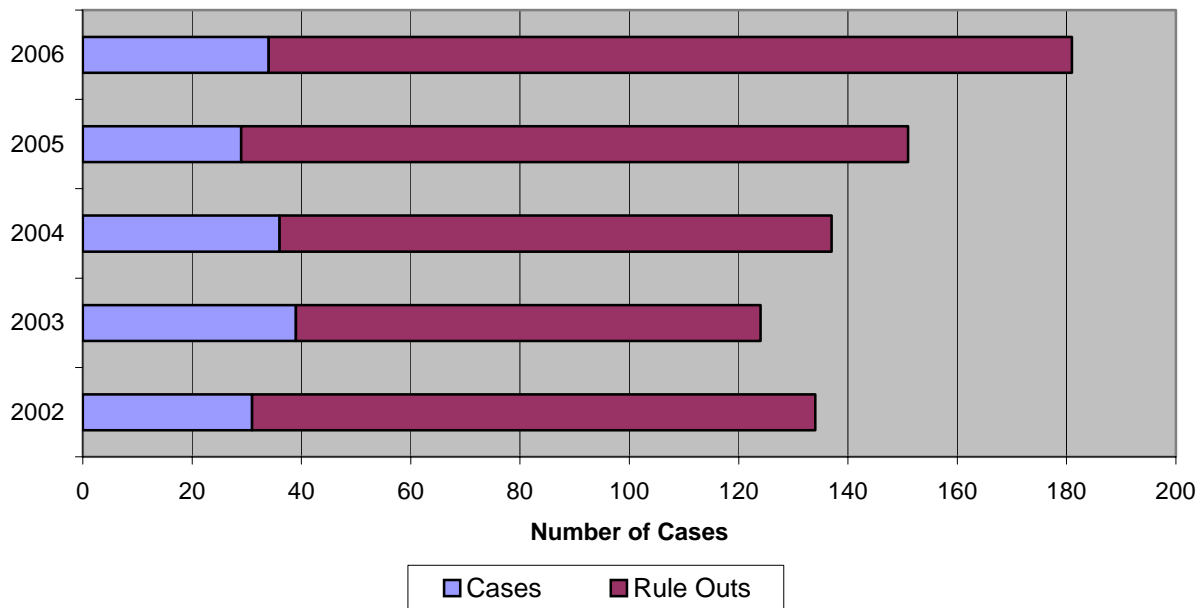
Source: The Utah Department of Health, Bureau of Communicable Disease Control, Tuberculosis Control Program.

Directly observed therapy (DOT) involves the direct visual observation by a health care provider or other reliable person of a patient's ingestion of medication. In 2006, 94% (32 of 34) of persons in Utah who started treatment for TB had all doses of medications thus far administered by DOT, and 6% (2 of 34) had one or more doses of medication self-administered in combination with the doses that were administered by DOT. Because TB treatment is typically administered for a minimum of six months, many of these patients are still on treatment.

From 2001 to 2005, an average of 93% of persons who were treated for TB in Utah had all doses of their medications given by DOT (range: 87%-97%), and an average of 6% completed their treatment utilizing a combination of directly-observed and self-administered therapy (range: 3%-9%). Two cases in 2002 were totally self-administered.

The most recent national statistics available regarding the percentage of cases given DOT are from the year 2003. In that year, 57% of the cases, for which information regarding DOT was available, completed treatment using only DOT and 28% utilized both directly-observed and self-administered therapy.

**Figure 21. Final Classification of TB Suspects, Utah, 2002-2006**



See Table 11, pg 30.

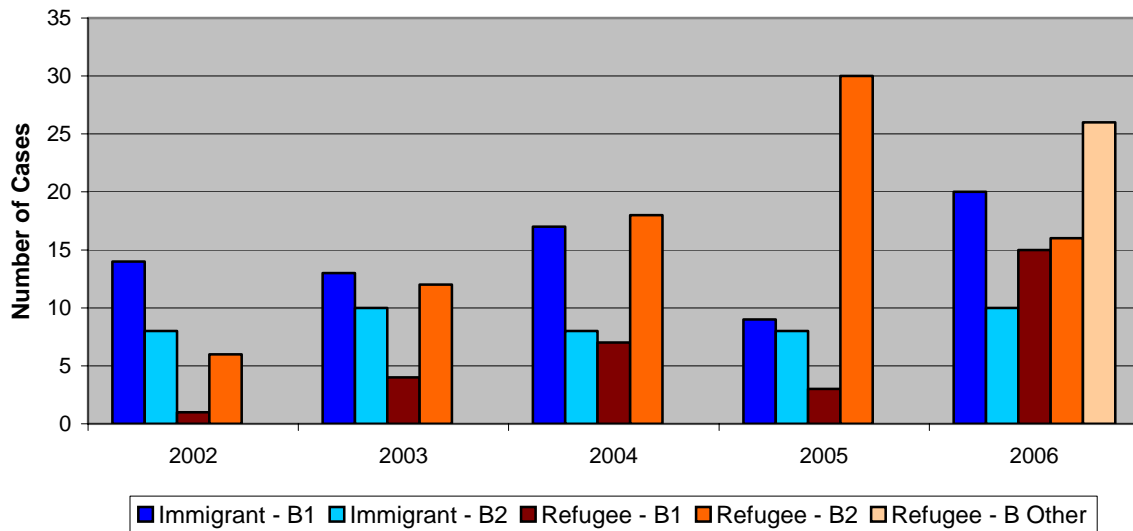
Cases of TB were classified in the year of report to the Centers for Disease Control and Prevention.

Source: The Utah Department of Health, Bureau of Communicable Disease Control, Tuberculosis Control Program.

In addition to the 34 reported cases of TB in Utah in 2006, there were 147 Utah residents that were reported as TB suspects. Each suspect was monitored by a public health agency to ensure the completion of a diagnostic evaluation for TB. In 2006, 19% (34 of 181) of all reported Utah suspects became verified TB cases, and 81% (147 of 181) of the suspects were ruled out as having TB.

From 2002 to 2006, a total of 727 Utah residents were reported as suspect TB. The percentage of Utah's TB suspects that were later diagnosed with active TB disease during this time frame ranged from 19% to 32% per year, with a five-year average of 23%. It is important for health care providers to consider TB as a possible diagnosis, even if an increase in suspect TB cases also means increased public health resources will be necessary to evaluate suspect cases.

**Figure 22. Class B Immigrant/Refugee Arrivals, Utah, 2002-2006**



See Table 12, pg 31.

Class B TB cases were classified in the year of arrival to the US.

Source: The Utah Department of Health, Bureau of Communicable Disease Control, Tuberculosis Control Program.

All immigrant and refugee applicants to the US must undergo an overseas health screening, including a chest x-ray and symptoms screening for TB.<sup>2</sup> Persons found to have Class A or infectious TB are not allowed to enter the US unless a waiver is granted. Persons found to have Class B TB require medical follow-up upon arrival in the US. Class B1 is clinically active but non-infectious TB, and Class B2 is TB that is not clinically active.

In 2006, 20 immigrants who moved to Utah were identified with Class B1 TB and ten were identified with Class B2 TB; 15 refugees who moved to Utah were identified with Class B1 TB and 16 were identified with Class B2 TB. Also in 2006, the Centers for Disease Control and Prevention (CDC) implemented a special "B Other" category for refugees arriving from Thailand, where outbreaks of multidrug-resistant TB in the refugee camps had occurred. Twenty-six B Other refugees arrived in Utah during 2006. All persons identified with Class B TB were referred to a state-contracted refugee clinic or the local health department of their new residence for further evaluation.

For the five-year period from 2002 to 2006, 73 immigrants who moved to Utah were identified with Class B1 and 44 were identified with Class B2 TB; 30 refugees were identified with Class B1; and 82 were identified with Class B2 TB. Prior to 2006, the number of Class B1 immigrants had been at least two times higher than the number of Class B1 refugees; however, in 2006, the number of B1 refugees neared the number of B1 immigrants. This is a result of refugees coming to Utah from an area of the world with an even higher prevalence of TB, such as Russia, Somalia, and Thailand. This highlights the importance of ensuring that newly-arriving refugees and Class B immigrants complete their health screenings in a timely manner.

<sup>2</sup> Immigrants are persons who are admitted to the US as lawful permanent residents. Refugees are persons outside their country of nationality who are unable or unwilling to return to that country because of persecution or a well-founded fear of persecution.

Table 1. Reported TB Cases and Case Rates,\*  
Utah and United States, 1993-2006

Year	Utah		US
	Cases	Rate*	Rate*
1993	47	2.5	9.8
1994	56	2.9	9.4
1995	48	2.4	8.7
1996	58	2.9	8.3
1997	36	1.6	7.4
1998	52	2.5	6.6
1999	40	1.9	6.3
2000	49	2.3	5.8
2001	35	1.6	5.6
2002	31	1.3	5.2
2003	39	1.7	5.1
2004	36	1.5	4.9
2005	29	1.1	4.8
2006	34	1.3	4.6

See Figures 1 and 2.

\*Cases per 100,000 population.

Cases of TB were classified in the year of report to the Centers for Disease Control and Prevention.

Sources: US Case Rate – The Centers for Disease Control and Prevention, Division of TB Elimination; Utah Cases and Rates – The Utah Department of Health, Bureau of Communicable Disease Control, Tuberculosis Control Program.

Table 2. TB Cases, Percentages, and Case Rates per 100,000 by Local Health District, Utah, 2002-2006

Year	No. of Cases/ Percent	Local Health District												Total
		Bear River	Central	Davis	Salt Lake	South eastern	South west	Summit	Tooele	Tri County	Utah	Wasatch	Weber- Morgan	
2002	Cases	0	0	3	19	1	2	0	1	2	3	0	0	31
	%	0.0	0.0	9.7	61.3	3.2	6.5	0.0	3.2	6.5	9.7	0.0	0.0	100.1
2003	Cases	0	0	3	26	1	2	1	1	1	1	0	3	39
	%	0.0	0.0	7.7	66.7	2.6	5.1	2.6	2.6	2.6	2.6	0.0	7.7	100.2
2004	Cases	2	0	0	23	1	1	0	1	1	5	1	1	36
	%	5.6	0.0	0.0	63.9	2.8	2.8	0.0	2.8	2.8	13.9	2.8	2.8	100.2
2005	Cases	0	0	1	21	0	0	1	0	2	4	0	0	29
	%	0.0	0.0	3.4	72.4	0.0	0.0	3.4	0.0	6.9	13.8	0.0	0.0	99.9
2006	Cases	2	1	1	26	1	1	0	0	0	1	0	1	34
	%	5.9	2.9	2.9	76.5	2.9	2.9	0.0	0.0	0.0	2.9	0.0	2.9	99.8
2002-2006	<b>Total Cases</b>	4	1	8	115	4	6	2	3	6	14	1	5	169
	%	2.4	0.6	4.7	68.0	2.4	3.6	1.2	1.8	3.6	8.3	0.6	3.0	100.2
2002-2006	<b>Total Population</b>	733,897	351,456	1,344,644	4,780,016	263,981	867,134	175,440	251,098	210,137	2,191,045	96,280	1,087,347	12,352,475
2002-2006	<b>Case Rate per 100,000</b>	0.5	0.3	0.6	2.4	1.5	0.7	1.1	1.2	2.9	0.6	1.0	0.5	1.4

See Figures 3 and 4.

Note: Percentages may not equal 100 due to rounding.

Cases of TB were classified in the year of report to the Centers for Disease Control and Prevention.

Source: Cases – The Utah Department of Health, Bureau of Communicable Disease Control, Tuberculosis Control Program; Population Estimates – Utah Governor's Office of Planning and Budget.

Table 3. TB Cases and Percentages by Gender, Age Group, Race/Ethnicity, and Foreign/US-Affiliated Islands (UAI)/US-Born Status, Utah, 2002-2006

Variable	2002		2003		2004		2005		2006		Total: 2002-2006	
	Cases	%	Cases	%	Cases	%	Cases	%	Cases	%	Cases	%
<b>Gender</b>												
Male	17	54.8	23	59.0	20	55.6	15	51.7	21	61.8	96	56.8
Female	14	45.2	16	41.0	16	44.4	14	48.3	13	38.2	73	43.2
Total	31	100.0	39	100.0	36	100.0	29	100.0	34	100.0	169	100.0
<b>Age Group</b>												
<15 yrs	2	6.5	7	17.9	3	8.3	4	13.8	6	17.6	22	13.0
15-24 yrs	4	12.9	5	12.8	6	16.7	3	10.3	4	11.8	22	13.0
25-44 yrs	12	38.7	10	25.6	14	38.9	10	34.5	12	35.3	58	34.3
45-64 yrs	9	29.0	9	23.1	7	19.4	9	31.0	9	26.5	43	25.4
>=65 yrs	4	12.9	8	20.5	6	16.7	3	10.3	3	8.8	24	14.2
Total	31	100.0	39	99.9	36	100.0	29	99.9	34	100.0	169	99.9
<b>Race/Ethnicity*</b>												
American Indian/Alaska Native	3	9.7	1	2.6	1	2.8	2	6.9	1	2.9	8	4.7
Asian	4	12.9	9	23.1	8	22.2	3	10.3	6	17.6	30	17.8
Black/African American	1	3.2	8	20.5	5	13.9	2	6.9	6	17.6	22	13.0
Hispanic	8	25.8	13	33.3	10	27.8	14	48.3	13	38.2	58	34.3
Native Hawaiian/Pacific Islander	2	6.5	1	2.6	3	8.3	0	0.0	3	8.8	9	5.3
White	13	41.9	7	17.9	9	25.0	8	27.6	5	14.7	42	24.9
Total	31	100.0	39	100.0	36	100.0	29	100.0	34	99.8	169	100.0
<b>Foreign, UAI,** vs US-Born</b>												
Foreign Born	19	61.3	28	71.8	23	63.9	22	75.9	22	64.7	114	67.5
UAI-Born	2	6.5	0	0.0	1	2.8	0	0.0	2	5.9	5	3.0
US Born with Foreign/UAI Connection	0	0.0	3	7.7	3	8.3	0	0.0	4	11.8	10	5.9
US Born with No Foreign/UAI Connection	10	32.3	8	20.5	9	25.0	7	24.1	6	17.6	40	23.7
Total	31	100.1	39	100.0	36	100.0	29	100.0	34	100.0	169	100.1

See Figures 5, 6, 7, 8, and 10.

\*All races are non-Hispanic.

\*\*Includes persons born in American Samoa, the Federated States of Micronesia, Guam, the Republic of the Marshall Islands, Midway Island, the Commonwealth of the Northern Mariana Islands, Puerto Rico, the Republic of Palau, the US Virgin Islands, and US minor and outlying Pacific islands.

Note: Percentages may not equal 100 due to rounding.

Cases of TB were classified in the year of report to the Centers for Disease Control and Prevention.

Source: The Utah Department of Health, Bureau of Communicable Disease Control, Tuberculosis Control Program.

Table 4. Reported TB Cases and Case Rates by Race/Ethnicity,  
Utah, 2002-2006

Year	American Indian/ Alaskan Native		Asian		Black/ African American		Hispanic*		Native Hawaiian/ Pacific Islander		White		Multiple Race	
	Cases	Population	Cases	Population	Cases	Population	Cases	Population	Cases	Population	Cases	Population	Cases	Population
2002	3	27,856	4	41,258	1	17,884	8	233,662	2	16,211	13	1,994,619	0	26,840
2003	1	28,385	9	42,914	8	18,431	13	248,069	1	16,599	7	2,031,571	0	27,649
2004	1	28,571	8	44,686	5	18,926	10	261,241	3	17,046	9	2,070,268	0	28,492
2005	2	29,019	3	46,258	2	19,532	14	274,679	0	17,367	8	2,112,814	0	29,257
2006	1	29,362	6	47,722	6	20,091	13	287,676	3	17,741	5	2,149,828	0	29,952
Total	8	143,193	30	221,599	22	94,864	58	1,305,327	9	84,964	42	10,357,805	0	142,190
Rate**	5.6		13.5		23.2		4.4		10.6		0.4		0.0	

See Figure 9.

\* All races are non-Hispanic.

\*\*Cases per 100,000 population.

Cases of TB were classified in the year of report to the Centers for Disease Control and Prevention.

Source: Cases – The Utah Department of Health, Bureau of Communicable Disease Control, Tuberculosis Control Program; Population – Calculated based on estimates from the Governor's Office of Planning and Budget.



Table 5. Countries of Origin for Foreign-Born\* Persons Reported with TB,  
Utah, 2002-2006

Country of Origin	Number	Percent
Mexico	38	33.3%
Somalia	9	7.9%
Vietnam	8	7.0%
Peru	6	5.3%
Philippines	6	5.3%
Sudan	5	4.4%
India	4	3.5%
Laos	3	2.6%
Others**	35	30.7%
Total	114	100.0%

See Figure 11.

\*Includes persons born outside the US, American Samoa, the Federated States of Micronesia, Guam, the Republic of the Marshall Islands, Midway Island, the Commonwealth of the Northern Mariana Islands, Puerto Rico, the Republic of Palau, the US Virgin Islands, and US minor and outlying Pacific islands.

\*\*Other countries include: Afghanistan, Argentina, Bangladesh, Bolivia, Bosnia, Cambodia, Canada, Chad, China, Cuba, Dominican Republic, El Salvador, Ethiopia, Guatemala, Iran, Iraq, Ireland, Israel, Korea, Kuwait, Lithuania, Liberia, Mongolia, Russia, Sierre Leone, Singapore, Tonga, Uruguay.

Cases of TB were classified in the year of report to the Centers for Disease Control and Prevention.

Source: The Utah Department of Health, Bureau of Communicable Disease Control, Tuberculosis Control Program.

Table 6. Length of US Residence Prior to TB Diagnosis in Foreign-Born Persons,\*  
Utah, 2002-2006

Length of US Residence	All		Mexico		Somalia		Vietnam		Others	
	Cases	%	Cases	%	Cases	%	Cases	%	Cases	%
<1 yr	31	27.2%	10	26.3%	6	66.7%	2	25.0%	13	22.0%
1-4 yrs	35	30.7%	14	36.8%	3	33.3%	0	0.0%	18	30.5%
>= 5 yrs	48	42.1%	14	36.8%	0	0.0%	6	75.0%	28	47.5%
Totals	114	100.0%	38	99.9%	9	100.0%	8	100.0%	59	100.0%

See Figure 12.

\*Includes persons born outside the US, American Samoa, the Federated States of Micronesia, Guam, the Republic of the Marshall Islands, Midway Island, the Commonwealth of the Northern Mariana Islands, Puerto Rico, the Republic of Palau, the US Virgin Islands, and US minor and outlying Pacific islands.

Note: Percentages may not equal 100 due to rounding.

Cases of TB were classified in the year of report to the Centers for Disease Control and Prevention.

Source: The Utah Department of Health, Bureau of Communicable Disease Control, Tuberculosis Control Program.

Table 7. TB Cases by Residence at Time of Diagnosis, Adult Homelessness and Substance Abuse, Site of Disease, and Case Verification, Utah, 2002-2006

Variable	2002		2003		2004		2005		2006		Total	
	Cases	%	Cases	%	Cases	%	Cases	%	Cases	%	Cases	%
<b>Residence At Time of Diagnosis</b>												
Private Residence	26	83.9	38	97.4	31	86.1	26	89.7	30	88.2	151	89.3
Homeless	3	9.7	1	2.6	2	5.6	2	6.9	1	2.9	9	5.3
Correctional Institution	0	0.0	0	0.0	3	8.3	1	3.4	1	2.9	5	3.0
Long Term Care Facility	1	3.2	0	0.0	0	0.0	0	0.0	1	2.9	2	1.2
Other	1	3.2	0	0.0	0	0.0	0	0.0	1	2.9	2	1.2
Total	31	100.0	39	100.0	36	100.0	29	100.0	34	99.8	169	100.0
<b>Homelessness and Substance Abuse in TB Cases Aged <math>\geq 15^*</math></b>												
Homeless	3	10.3	1	3.1	5	15.2	1	4.0	3	10.7	13	8.8
Injecting Drug Use	0	0.0	0	0.0	0	0.0	1	4.0	0	0.0	1	0.7
Non-Injecting Drug Use	1	3.4	0	0.0	2	6.1	0	0.0	1	3.6	4	2.7
Excess Alcohol Use	2	6.9	4	12.5	7	21.2	2	8.0	0	0.0	15	10.2
Total Cases Aged $\geq 15$	29		32		33		25		28		147	
<b>Site of Disease</b>												
Pulmonary	17	54.8	28	71.8	23	63.9	19	65.5	18	52.9	105	62.1
Pulmonary & Extrapulmonary	4	12.9	2	5.1	1	2.8	3	10.3	6	17.6	16	9.5
Extrapulmonary	10	32.3	9	23.1	12	33.3	7	24.1	10	29.4	48	28.4
Total	31	100.0	39	100.0	36	100.0	29	99.9	34	99.9	169	100.0
<b>Case Verification</b>												
Positive Culture	24	77.4	29	74.4	31	86.1	21	72.4	22	64.7	127	75.1
Positive Smear/Tissue	1	3.2	0	0.0	1	2.8	0	0.0	0	0.0	2	1.2
Clinical	3	9.7	5	12.8	2	5.6	6	20.7	8	23.5	24	14.2
Provider	3	9.7	5	12.8	2	5.6	2	6.9	4	11.8	16	9.5
Total	31	100.0	39	100.0	36	100.1	29	100.0	34	100.0	169	100.0

See Figures 13, 14, 17, and 18.

\* Homelessness and substance abuse in the 12 months prior to TB diagnosis; categories are not mutually exclusive.

Note: Percentages may not equal 100 due to rounding.

Cases of TB were classified in the year of report to the Centers for Disease Control and Prevention.

Source: The Utah Department of Health, Bureau of Communicable Disease Control, Tuberculosis Control Program.

Table 8. TB Cases and Percentages in Persons with HIV Test Results and with HIV Coinfection by Age Group, Utah, 2002-2006

Year	25-44 Years Old*				All Ages*			
	HIV Test Results		HIV Positive		HIV Test Results		HIV Positive	
	Cases	%	Cases	%	Cases	%	Cases	%
2002	11	91.7%	0	0.0%	25	80.6%	0	0.0%
2003	9	90.0%	0	0.0%	27	69.2%	1	2.6%
2004	14	100.0%	2	14.3%	33	91.7%	2	5.6%
2005	10	100.0%	2	20.0%	28	96.6%	3	10.3%
2006	12	100.0%	1	8.3%	34	100.0%	1	2.9%
TOTAL	56	96.6%	5	8.6%	147	87.0%	7	4.1%

See Figures 15 and 16.

\*Includes persons with positive, negative, or indeterminate HIV test results. Percentages based on all reported TB cases.

Cases of TB were classified in the year of report to the Centers for Disease Control and Prevention.

Source: The Utah Department of Health, Bureau of Communicable Disease Control, Tuberculosis Control Program.

Table 9. Primary Anti-TB Drug Resistance, Utah, 2002-2006

Year	Total Culture Positive Cases	Cases with Drug Susceptibility Results		Resistance					
				>= 1 Drug		At Least INH		At Least INH & RIF (MDR-TB)	
		Cases	%	Cases	%	Cases	%	Cases	%
2002	24	23	95.8%	5	22.0%	1	4.0%	0	0.0%
2003	29	29	100.0%	3	10.0%	2	7.0%	1	3.0%
2004	31	31	100.0%	7	23.0%	4	13.0%	0	0.0%
2005	21	21	100.0%	1	5.0%	0	0.0%	0	0.0%
2006	22	22	100.0%	6	27.0%	3	14.0%	0	0.0%
TOTAL	127	126	99.2%	22	17.5%	10	7.9%	1	1.0%

See Figure 19.

Cases of TB were classified in the year of report to the Centers for Disease Control and Prevention.

Source: The Utah Department of Health, Bureau of Communicable Disease Control, Tuberculosis Control Program.

Table 10. Use of Directly Observed Therapy (DOT), Utah, 2001-2006

Year	Total Starting Tx	DOT Only		Both DOT & Self-Administered		Self-Administered Only	
		Cases	%	Cases	%	Cases	%
2001	33	30	90.9%	3	9.1%	0	0.0%
2002	31	27	87.1%	2	6.5%	2	6.5%
2003	37	34	91.9%	3	8.1%	0	0.0%
2004	35	34	97.1%	1	2.9%	0	0.0%
2005	29	28	96.6%	1	3.4%	0	0.0%
TOTAL 01-05	165	153	92.7%	10	6.1%	2	1.2%
2006	34	32	94.1%	2	5.9%	0	0.0%

See Figure 20.

\*Many patients have not completed treatment.

Cases of TB were classified in the year of report to the Centers for Disease Control and Prevention.

Source: The Utah Department of Health, Bureau of Communicable Disease Control, Tuberculosis Control Program.

Table 11. Final Classification of TB Suspects, Utah, 2002-2006

Year	Total Suspects	Number Ruled Out	Number Cases	% Verified TB Cases
2002	134	103	31	23.1%
2003	124	85	39	31.5%
2004	137	101	36	26.3%
2005	151	122	29	19.2%
2006	181	147	34	18.8%
TOTAL	727	558	169	23.2%

See Figure 21.

Cases of TB were classified in the year of report to the Centers for Disease Control and Prevention.

Source: The Utah Department of Health, Bureau of Communicable Disease Control, Tuberculosis Control Program.

Table 12. Class B Immigrant/Refugee\* Arrivals, Utah, 2002-2006

Year	Immigrants		Refugees		
	B1	B2	B1	B2	BO
2002	14	8	1	6	N/A
2003	13	10	4	12	N/A
2004	17	8	7	18	N/A
2005	9	8	3	30	N/A
2006	20	10	15	16	26
<b>TOTAL</b>	<b>73</b>	<b>44</b>	<b>30</b>	<b>82</b>	<b>26</b>

See Figure 22.

\* Class B1TB is clinically active, not infectious; Class B2TB is not clinically active; and Class B Other (BO) is a category established in 2006 for refugees arriving from Thailand, where outbreaks of multi-drug resistant TB had occurred in refugee camps.

Note: Immigrants are persons who are admitted to the US as lawful permanent residents. Refugees are persons outside their country of nationality who are unable or unwilling to return to that country because of persecution or a well-founded fear of persecution.

Class B TB cases were classified by the year of arrival to the US.

Source: The Utah Department of Health, Bureau of Communicable Disease Control, Tuberculosis Control Program.